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Toshiba DOCSIS Cable Modem

Owner's Manual

PCX2600
Model Name   DAZ8823A

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Warning:

This product may not be exported outside the US and Canada without US Department of Commerce, Bureau of Export Administration authorization. Any export or re-export by the purchaser, directly or indirectly, in contravention of U.S. Export Administration Regulation is prohibited.

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Congratulations on Your Purchase!

Your new Toshiba DOCSIS Cable Modem will provide you with high-speed access to the Internet through your cable TV (CATV) network- accesses at a fraction of the time it takes traditional telephone modems. In addition, your service will be always connected. Those two features give you the information you want, when you want it … and your telephone line is kept free.

Contact Information

Support Information

Phone: (949) 583-3223

Fax: (949) 583-3597

e-mail: cablesupport@networks.toshiba.com

Sales Information

Phone: (949) 461-4840

e-mail: cablesales@networks.toshiba.com

Web Page

http://networks.toshiba.com

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 Important Rules for Safe Operation

In addition to the careful attention devoted to quality standards in the manufacture of your Toshiba PCX2600, safety is a major factor in the design of every product. However, safety is your responsibility, as well.

This section lists important information that will help assure your enjoyment and proper use of the PCX2600 and accessory equipment. Please read it carefully before operating and using your PCX2600.

<Installation>

Read and Follow Instructions - You should read all the safety and operating instructions before operating the modem. Follow all operating instructions.

Retain Instructions - You should save all the safety and operating instructions, for your future reference.

Heed Warnings - Comply with all warnings on the PCX2600 and in the operating instructions.

Use the Recommended AC Adapter - You must use the Adapter that comes with your Toshiba PCX2600.

Check Power Sources - The AC adapter for your Toshiba PCX2600 must be used with an AC120V 60Hz supply outlet. If you are not sure of the type of power supplied to your home, consult your dealer or local power company.

Be Careful of Overloading - Do not overload wall outlets or extension cords, as this can result in a risk of fire or electric shock. Overloaded AC outlets, extension cords, frayed power cords, damaged or cracked wire insulation, and broken plugs are dangerous. Periodically examine the cord, and, if its appearance indicates damage or deteriorated insulation, have it replaced by your service technician.

Protect Power Cords - Route power supply cords so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to cords where they are attached to plugs and convenience receptacles, and examine the point where the power cord attaches to the PCX2600.

Check Ventilation - Slots and openings in the enclosure are provided for ventilation to ensure reliable operation of the PCX2600 and to protect it from overheating. Do not block or cover these openings. Never block these openings by placing the PCX2600 on a bed, sofa, rug, or other similar surface. Never place the PCX2600 near or over a radiator or heat register, or any other heat source (including amplifiers). Do not place the PCX2600 in a built-in installation, such as a bookcase or equipment rack, unless you provide proper ventilation.

Do Not Use Accessories - Do not use attachments, unless they are recommended by Toshiba, as they may cause electrical or fire hazards.

Do Not Use Near Water - Do not use the PCX2600 near water - for example, near a bath tub, sink or laundry tub, in a wet basement or near a swimming pool.

Do Not Place Near High Temperature Source - Do not use the PCX2600 near a source of heat such as a Kitchen range, a fireplace or a radiator.

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Use Caution in Mounting the PCX2600 - Do not place the PCX2600 on an unstable surface or support. The PCX2600 may fall, causing serious injury to a child or adult, as well as serious damage to the PCX2600.

Use Care in Moving Product-and-Cart Combinations - Quick stops, excessive, force and uneven surfaces may cause the product-and-cart combination to overturn.

Do Not use Near Medical Equipment - Do not operate the PCX2600 near equipment that is susceptible to electrical interference, or is used for medical purpose. Do not use the PCX2600 near a pacemaker of a patient care area in the hospital.

Ground the Cable Systems – Be sure that the outside cable system is grounded, so as to provide some protection against voltage surges and built-up static charges. Section 810 of the national Electric Code, ANSI/NFPA No. 70-1984 (Section 54 of the Canadian Electrical Code, Part 1) provides information with respect to proper grounding of the cable systems.

Do not disconnect RF cable from your PCX2600 while the power to your modem is on.

Wait at least 10 seconds between disconnecting and reconnecting the PCX2600 with the AC adapter.

Unplug the PCX2600 from the wall outlet carefully, as the AC adapter may be hot.

<USE and Maintenance>

*Unplug Power Before Cleaning-*Do not use liquid cleaner or aerosol cleaner. Use a damp cloth for cleaning.

Keep Objects Out of Openings - Never push objects of any kind into the PCX2600 through openings such as the ventilation holes, as they may touch voltage circuits and "short-out" parts, which could result in a fire or electric shock. Never spill liquid on the PCX2600.

Protect From Lightning - Unplug the PCX2600 during a lightning storm, or when it unattended and unused for long periods. Remove the power adapter from the wall outlet. This will prevent damage to the PCX2600 due to lightning and power line surges. Take care not to touch the metal portion of PCX2600 or cables in a lightning storm.

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<Service>

Do Not Remove Covers - Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

Removing the cover VOIDs your warranty.

Refer Servicing to Qualified Service Personnel Under the Conditions Listed Below

- If the power supply cord or plug is damaged.
- If liquid has been spilled or objects have fallen into the PCX2600
- If the PCX2600 has been exposed to rain or water.
- If the PCX2600 does not operate normally by following the operating instructions.
- If the PCX2600 has been dropped or the cabinet has been damaged.
- When the PCX2600 exhibits a distinct change in operation, such as the inability to complete its self-test.

Require Safety Check - Upon completion of any service or repairs to the PCX2600, ask the service technician to perform safety checks recommended by service point to determine that the PCX2600 is in safe operating condition.

Overview

The modem provides you with high-speed data communications over the television cable network by following the widely accepted DOCSIS standards that were developed by Cable Television Laboratories, Inc. This standard offer a combination of high performance and interoperability among many of the cable system operators in North America.

How does a cable modem work?

As you know, digital signals are represented by high and low electrical voltage levels. And how fast these levels can switch and still be transmitted is determined by the "bandwidth" of the transmission system. The pair of wires used in a telephone connection have greatly limited bandwidth, because of their electrical characteristics. So what we do is connect a device called a modem between the computer output and the phone line. The modem generates an electrical wave whose strength and phase change in step with the highs and lows of the computer's digital output. It's because of the "smoothness" of the resultant signal that a higher data rate can be transmitted.

A cable modem MOdulates and DEModulates electrical signals in the same sense that the telephone modem does. However, since coaxial cable can carry much higher wave frequencies, cable modems are far more sophisticated. Their internals can include a tuner, a bridge, a router, an encryption/decryption device, an SNMP agent, USB port and an Ethernet hub. Furthermore, none of the activity caused by these circuits and codes disturbs your regular cable TV reception.

How does a cable modem connect to a computer?

The Ethernet connection and USB connection used in this Cable Modem are emerging as the most popular means of connecting a Cable Modem.

The new DOCSIS standard may change this in the future. But for now, an Ethernet or USB must be ready in your computer for the Cable Modem to work.

What is DOCSIS?

Data **O**ver **C**able **S**ervice **I**nterface **S**pecifications. DOCSIS defines interface requirements for cable modems involved in high-speed data distribution over a cable television network. On November 17, 1997, Cable Television Laboratories, Inc. (Cable Labs) and its members established a formal path of certification for cable modem equipment suppliers to obtain an interoperability seal for their products based on the DOCSIS specification. This certification process provides cable modem equipment suppliers with a fast, market-oriented method for attaining cable industry acknowledgment of compliance with DOCSIS.

The seal is meant to provide the purchaser with a way to be confident that the modem equipment to be purchased is compliant with the specification, and that the equipment interoperates with DOCSIS products made by other vendors.

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# Getting Started

Contacting your Cable Provider

Please keep in mind that you will need to notify your cable internet provider before using the new Toshiba PCX2600, even if you have a cable modem that is currently functioning with your computer.

Package Contents for the PCX2600

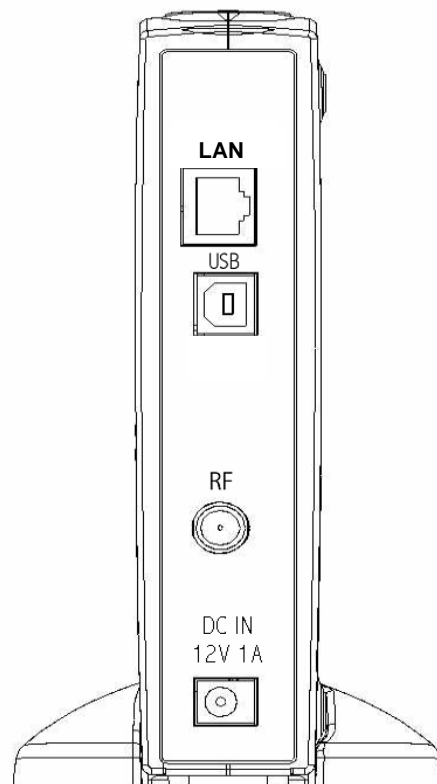Make sure that you've received the following items. Contact your dealer immediately if any item is missing or damaged.

(1) Toshiba PCX2600 Cable Modem
(2) LAN Cable
(3) USB Cable
(4) AC Adapter
(5) Stand
(6) CD-ROM
(7) Warranty Statement
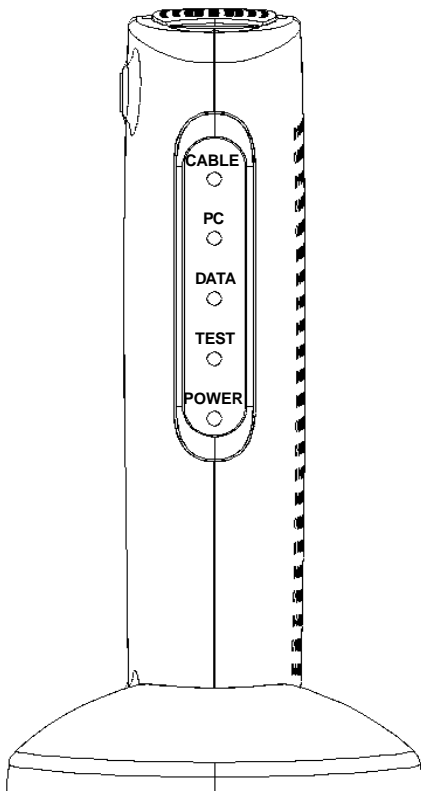
<table>
<tr><td align="center">**Front side LEDs**</td><td align="center">**Rear side Connectors**</td></tr>
</table>

Refer to the back cover for cable modem installation instructions.

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Installing the USB Drivers

If you are using the USB(Universal Serial Bus) interface to connect the PCX2600 to your Windows PC via the USB, you must install the "USB Driver" in your computer. The USB Drivers for your operating system is located in the CD-ROM shipped with the PCX2600.

Please note that these USB Drivers only support a computer running Microsoft Windows 98SE, 2000, Me and XP. These drivers are not supported on the following operating systems: Windows 98 First Edition; Windows 95 or any earlier version of Microsoft Windows or DOS OS; Macintosh; Unix/Linux; and IBM OS/2.

Before installing and using these drivers, please be sure to read the "**End-User License Agreement**" which is enclosed in the Caution booklet. You will be deemed to agree to this agreement if you use these drivers.

Preparation
(1)Confirm the PCX2600 is ready by verifying the status panel LEDs.
   (See "LED Diagnostics")
(2)Insert the USB Drivers CD-ROM into your CD-ROM drive.
(3)Plug the "Type B" end of the USB cable into the back of the PCX2600.
(4)Plug the "Type A" end of the USB cable into the USB port of your computer.
(5)Turn on your computer.

Installing USB Drivers
(1)After following the instructions described in "**Preparation**" on this page, your Windows computer should finish its boot process and display a window identifying the PCX2600 as a new device and requesting its driver.
(2)Select "**Search for the Best Driver for your device**" and click "**Next**".
(3)Select "**CD-ROM drive**" and click "**Next**".
(4)Confirm that the path is correct and click "**Next**".
   Windows should then begin installation.
(5)Click "**Finish**" to complete the driver installation.
(6)Once this is complete, the process will be repeated for the
   "**PCX2600…Networking Support**"
(7)Once complete, you are ready to surf the internet at warp speed using your new PCX2600 Cable Modem.

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Important Information

If you have trouble installing the USB drivers for your new PCX2600, you may have inadvertently installed the USB Composite Device Driver that Windows 98SE automatically loads. To correct this problem, please execute the instructions.

USB COMPOSITE DRIVER REMOVAL

(1) Make sure that the USB cable is plugged into your computer.

(2) Restart your computer.

(3) At the Windows desktop, click on the "**Start**" button; selected "**Settings**" and then "**Control Panel**".

(4) From inside the "**Control Panel**" choose "**System**".

(5) Choose the tab on the top of the screen for "**Device Manager**".

(6) Click the "**+**" next to "**Universal Serial Bus Controllers**".

(7) Click "**USB Composite Device**" to select it and choose "**Remove**".

(8) Once the USB Composite Device is removed, restart your computer and follow the instructions starting with the "**Preparation**" section of previous pate.

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LED Diagnostics

The PCX2600 has five status LEDs for diagnostics. You can monitor the LEDs during installation and during normal operations.

Table 1 shows PCX2600 status LEDs and identifies what each LED light means. This table will help you to diagnose problems.

Function	Color	Definition
Cable	Green	- dark for no downstream RF carrier present or power off - flashing slowly(*1) for downstream RF carrier present and ranging in progress - flashing fast(*2) for registration in progress - solid for the Cable Modem registered and ready to transfer data
PC	Green	- dark for no carrier to/from PC present or power off - solid for carrier to/from PC present
Data	Green	- dark for no user data going through the Cable Modem or power off - flashing for user data going through the Cable Modem
Test	Amber	- dark for initial self-test of the Cable Modem OK(*3) or power off - flashing for initial self-test of the Cable Modem in progress(*3) or software down loading of the Cable Modem in progress - solid for self-test failure of the Cable Modem
Power	Green	- dark for power off - solid for power on

Table 1   Status LEDs

(*1) flashing slowly : flashing every 2 seconds (approximately)

(*2) flashing fast   : flashing every 0.1 second (approximately)
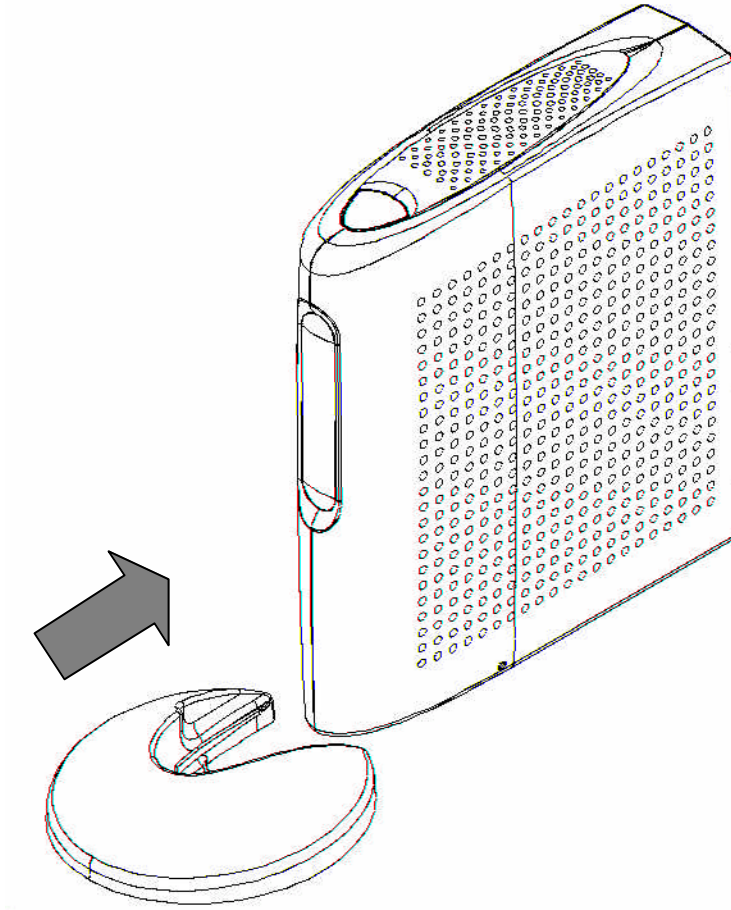
(*3) It takes about 30 seconds to complete the self-test of the Cable Modem after power on.

   Then searching the downstream RF carrier will be started.

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How to Use the Stand

Please attach the stand to the front of the PCX2600, referring to the figure below.

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Specifications

The Toshiba PCX2600 is DOCSIS compliant.

<RF Interface>

Receiver

Physical Speed:	30 Mbps (64QAM) / 43 Mbps (256QAM)
Symbol rate:	5.056941 Msym/sec (64QAM)
	5.360537 Msym/sec (256QAM)
Demodulation:	64QAM / 256QAM
Bandwidth:	6 MHz
Frequency range:	88 MHz to 860 MHz (edge-to-edge) in 62.5 kHz steps
Input signal level:	-15 dBmV to +15 dBmV
Input impedance:	75 ohms
Input Return loss:	> 6 dB from 88 MHz to 860 MHz

Transmitter

Physical Speed:	320,640,1280,2560,5120Kbps(QPSK)
	640,1280,2560,5120,10240Kbps(16QAM)
Symbol rate:	160, 320, 640, 1280, 2560 ksym/sec
Modulation:	QPSK / 16QAM
Bandwidth:	200, 400, 800, 1600, 3200 kHz
Frequency range:	5 to 42 MHz (edge-to-edge), in 1Hz steps
Output signal level:	8 dBmV to 58 dBmV (QPSK)
	8 dBmV to 55 dBmV (16QAM)
Output impedance:	75 ohms
Output Return loss:	> 6 dB from 5 MHz to 42 MHz

<PC Interface>

LAN:	10BASE-T / 100BASE-TX
	(10/100Mbps; full/half-duplex, Auto-Negotiation)
USB:	12Mbps

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\<Power\>

AC adapter input: 120VAC @ 60Hz

AC adapter output to cable modem: 12VDC @1A

AC Power consumption: 8 W (approximately)

\<Mechanical\>

Size (inches): 1.4+/-0.1 (width)   x   6.5+/-0.1 (height)   x   5.7+/-0.1 (depth)

(not includes the stand)

Weight (lbs): 1.1 (approximately, not includes the AC adapter)

\<Environmental\>

Operating

temperature: 32 to 104 degrees Fahrenheit

Humidity: 10 to 90 percent (non-condensing)

Storage temperature: -4 to 140 degrees Fahrenheit

Safety: EN60950

UL1310

UL1950

EMC E55022 : 1998 3rd. Class B Emissionr)

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Q & A

Q: How to connect the PCX2600 to the hub/switch via the LAN interface ?

A: The PCX2600 is connected to the uplink port on the hub/switch, or use cross-over Ethernet cable to connect the normal port on the hub/switch. (See below)
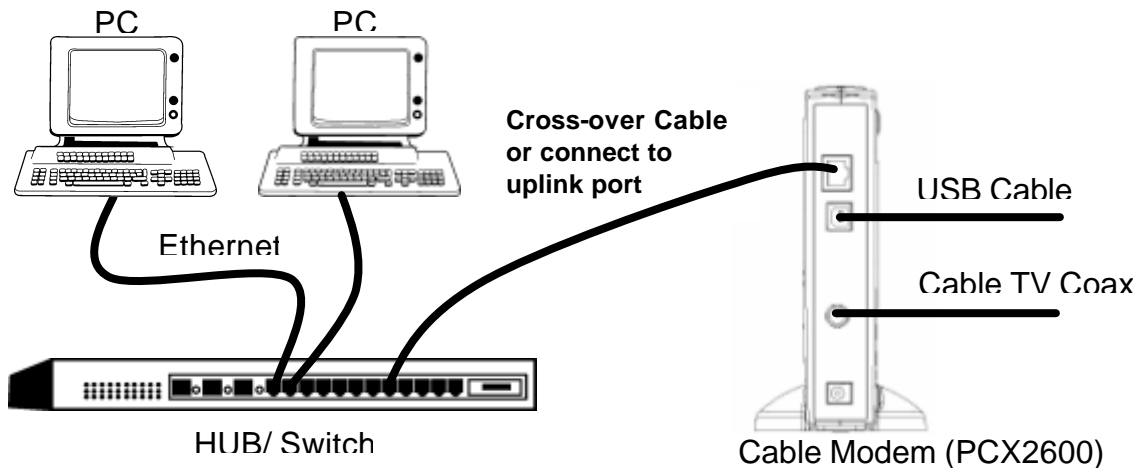
Q: How to connect the PCX2600 to the computer via the USB ?

A: Plug the Type A end of the USB cable into the USB port of your computer.
And plug the Type B end of the USB cable into the USB port located in the back of PCX2600. (See above)

NOTES: Macintosh computers do not support networking through USB.
Mac users must use an Ethernet connection.

Q: Do I need to turn off the PCX2600 ?

A: No. You can leave PCX2600 powered up.

Q: How can I connect multiple computers to the PCX2600 ?

A: You can use LAN and USB interfaces simultaneously, and also can use a hub or switch for physical connection. The PCX2600 is controlled by the Cable Operator to allocate how many computers are available. Please contact your local Cable Operator to activate multiple computers under the PCX2600.

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Q: Where can I download the driver for my PCX2600 ?

A: If you are using LAN interface, the PCX2600 is a stand-alone device that has a
Ethernet port. All workstations or hub must have a 10BASE-T/100BASE-TX port or
card to connect to the PCX2600. Since the PCX2600 is a stand alone device, there
is no special driver needed on the workstation.

In the case of the USB interface, the PCX2600 that connects to a PC running
Microsoft Windows 98SE, 2000, Me or XP via the USB interface, you must install
"**USB Driver**" in your computer. The USB driver for your operating system is located
in the CD-ROM shipped with the PCX2600.

Q: How can I configure the PCX2600 and get monitoring information from it ?

A: The PCX2600 can only be configured and monitored by your cable operator.

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Regulatory

<>FCC Notice:

This equipment has been tested and found to comply with the limits for a Class B personal computer and peripherals, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this unit does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or experienced radio/TV technician for help.

<>International declaration of conformity:

This equipment has been tested and found to comply with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC. Conformity with these Directives is based upon compliance with the following harmonized standards:

Safety:
  EN60950:1992

EMC:
  EN55022 : 1998 Class B
  EN61000-3-2 : 1995
  EN61000-3-3 : 1995

  EN55024 : 1998
    IEC61000-4-2 : 1995
    IEC61000-4-3 : 1995
    IEC61000-4-4 : 1995
    IEC61000-4-5 : 1995
    IEC61000-4-6 : 1996
    IEC61000-4-8 : 1993
    IEC61000-4-11 : 1994

Glossary

10BASE-T

Unshielded, twisted pair cable with an RJ-45 connector, used with Ethernet LAN. "10" indicates the speed (10 Mbps), "Base" refers to baseband technology, and "T" means twisted pair cable.

100BASE-TX

Unshielded, twisted pair cable with an RJ-45 connector, used with Ethernet LAN. "100" indicates the speed (100 Mbps), "Base" refers to baseband technology, and "TX" means a connection by two-pair twisted pair cables.

Cable TV Coax

Cable that allows wide bandwidth transmission over long distances. Coaxial cable (coax) comprises an inner conductor surrounded by insulation. An outer conductor wraps around the insulation, which, in turn, is covered by an outer plastic covering.

Ethernet card

A plug-in circuit board installed in an expansion slot of a personal computer. The Ethernet card (sometimes called a Network Interface Card, or NIC) takes parallel data from the computer, converts it to serial data, puts it into a packet format, and sends it over the LAN cable.

F connector

A type of coaxial connector, labeled RF on the rear of the Toshiba Cable Modem, that connects the modem to the cable system.

Headend

The equipment, in the central office of the service provider, where the cable signals originate.

Hybrid Fiber/ Coaxial (HFC) system

A system where the trunk of the cable plant is of fiber technology. Somewhere near the subscriber's home, the fiber is connected to a coaxial cable, and the signal is converted so that it's compatible with the fiber media. The coaxial cable then runs through the branches of the network and is finally dropped into the home.

HUB

A device used to connect multiple computers to the cable modem.

Internet

A collection of interconnected networks used for worldwide computer-based communications.

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IP Address

A unique, 32-bit address assigned to every device in a network. An IP (Internet Protocol) address has two parts: 1) a network address and 2) a host address. Each network is assigned an address by a government agency, and each company administrator assigns an address to each host computer.

MAC address

RF-MAC address is used for data services. This RF-MAC address is required to provision Cable Modem for high-speed data services.

Modem registration

The process the Toshiba Cable Modem uses to make itself known to the headend equipment. Once authorized by the router, the modem is assigned upstream and downstream channels for data communication.

Network driver

A (software) file included with the Ethernet card. The file is loaded on the computer to allow the computer to recognize the Ethernet card. See Ethernet Card.

RJ-45

Connector on the Toshiba Cable Modem, labeled LAN, that connects the modem to a computer or to a HUB.

Subscriber

A computer user in the home who accesses a data service using the Toshiba Cable Modem.

Subnet

A network subdivision. When subnetting us used, the IP (Internet Protocol) address is divided into a subnet number and a host number. Hosts and gateways identify the bits used for the network and subnet number through the use of a subnet mask.

TCP/IP communication stack

Software in the subscriber computer that processes packets through the communication layers. The subscriber configures the IP address for the computer and the router default gateway in the software. The TCP/IP communication stack handles all the communications with the subscriber's application.

USB

Universal Serial Bus, standardized for easy connections between the PC and the other peripherals. USB connects more than computers and peripherals.

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Installing the PCX2600

To avoid thermal problems, allow at least one inch spacing between the ventilation holes and any object to either side of the unit. It's best to have no obstructions on top of the unit. The top of the unit should be at least two inches from any obstruction.

Connect the PCX2600 using the following steps, referring to the figure below.
1. Connect the Cable TV coax to the input connector of a signal splitter.
2. Connect a coaxial cable from one of the output connectors of the splitter to the input connector of the television set.
3. Connect a coaxial cable from the other output connector of the splitter to the RF input connector on the cable modem rear panel.
4. Connect the Ethernet and/or USB signal cable(s) from your computer(s) to the Ethernet and/or USB connector(s) on the cable modem rear panel.
5. Connect the AC adapter to the DC IN 12V 1A jack on the cable modem rear panel. Then plug in the AC adapter to the wall electrical outlet.
6. If using the USB interface, you must install the "**USB Driver**" with the instructions described in "**Installing the USB Drivers**" in this manual.
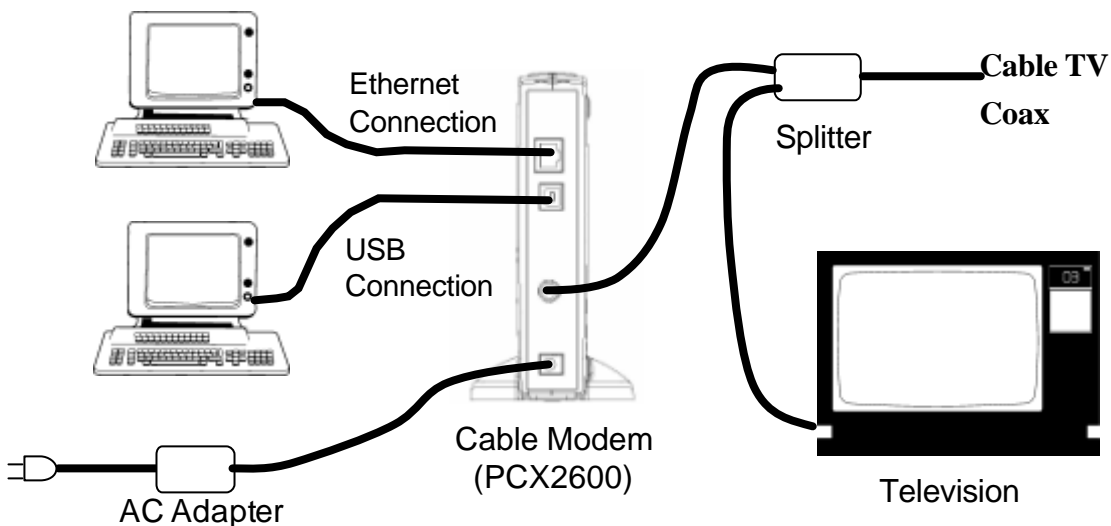
The power indicator LED on the modem front panel will light, if power is present at the outlet. The PCX2600 will start operating once power is connected. No additional operator intervention is required. It will automatically find the data channel, register and connect to your computer.

Check the PCX2600 status. The front panel indicators (LEDs) show that the PCX2600 is operating properly when they are in the following condition:

    CABLE - lit

    PC - lit

    DATA - flashing or not lit

    TEST - not lit

    POWER – lit